Remarks/Arguments

Applicant appreciates the helpful feedback and guidance received from Examiner Hirl in the "Detailed Action" and "Reponse to Arguments" section. The claims are amended to respond to the Office communication.

Claim Rejections – 35 USC §101

Examiner Hirl stated that basis for the rejections are:

The invention is ineligible because it has not been limited to a substantial practical application, determined by the final result achieved by the claimed invention is useful, tangible and concrete. Simply, the results are not practical applications.

Applicants appreciate Examiner Hirl detailed action containing helpful clarification and guidance and respectfully respond as follows:

Claims 1 - 6

The independent claim 1 is amended to add

1. "computerized" method.
   This clarifies that the method is for a computerized system for practical applications.
2. decision system applications "such as data mining, automatic process control, automatic target recognition, intelligent search, and machine vision"
   This defines the substantial practical applications.
3. decision tree "encapsulating the knowledge acquired from practical applications".
   This clarifies that the decision tree is for practical applications.
4. "wherein the decision characteristic regulates the decision tree for making robust decisions on new data in decision system applications".
   This clarifies the **result** of this claim, "decision characteristic", is for practical application.

Applicants respectfully submit that the amendment overcomes Examiner Hirl's rejection basis for claims 1 –6.

Claims 7 - 14

The independent claim 7 is amended to add

1. "computerized" method.
   This clarifies that the method is for a computerized system for practical applications.

2. decision system applications "such as data mining, automatic process control, automatic target recognition, intelligent search, and machine vision"
   This defines the substantial practical applications.
3. decision tree "encapsulating the knowledge acquired from practical applications".
   This clarifies that the decision tree is for practical applications.
4. "wherein the confidence value integrates local and consistent global information for making robust decisions on new data in decision system applications".
   This clarifies the **result** of this claim, "confidence value", is for practical application, .

Applicants respectfully submit that the amendment overcomes Examiner Hirl's rejection basis for claims 7 –14.

Claims 15 - 22

The independent claim 15 is amended to add

1. "computerized" method.
   This clarifies that the method is for a computerized system for practical applications.
2. decision system applications "such as data mining, automatic process control, automatic target recognition, intelligent search, and machine vision"
   This defines the substantial practical applications.
3. decision tree "encapsulating the knowledge acquired from practical applications".
   This clarifies that the decision tree is for practical applications.
4. "wherein pruned tree avoid over-fitting of data allowing robust decisions on new data in decision system applications".
   This clarifies the **result** of this claim, "pruned tree", is for practical application,

Applicants respectfully submit that the amendment overcomes Examiner Hirl's rejection basis for claims 15 –22.

Claim 23

Claim 23 is amended to add

1. "computerized" method.
   This clarifies that the method is for a computerized system for practical applications.
2. decision system applications "such as data mining, automatic process control, automatic target recognition, intelligent search, and machine vision"
   This defines the substantial practical applications.
3. training samples "acquired from practical applications".
   This clarifies that the training samples are for practical applications.
4. "wherein partition for the node allows robust decisions on new data in decision system applications".

This clarifies the **result** of this claim, "partition for the node", is for practical application, .

Applicants respectfully submit that the amendment overcomes Examiner Hirl's rejection basis for claim 23.

Claim Rejections – 35 USC §102

Examiner Hirl rejected claims 1-23 as being anticipated by Guyon et. al (Guyon).

This invention provides a decision regulation method that separates noise from consistent application domain characteristics and integrates multiple types of information to create robust decisions that work well for the application in spite of the application dynamics and/or errors in training data. One object of the invention is to automatically compensate for unequal class prevalence of the training data. Another object of the invention is to enable adjustment between a local and global decision basis to yield a balance point to match an application. A third object is to regulate the decision tree generation process by information integration. The fourth object is to provide reliability measures, and new pruning methods for automatic optimization of hierarchic decision structures.

Advantages include the removal of noise from the decision process and integration of local information and consistent global information for decisions. This invention automatically compensates for unequal class prevalence of the training data. This invention enables the adjustment between local and global decision basis to yield an improved decision basis to match the application. This invention integrates the available information to improve decisions and to minimize the amount and quality of training data required. This invention allows for automatic optimization of hierarchical decision structures generated from other approaches.

Guyon discloses a method to preprocess a training data set in order to allow the most advantageous application of the learning machine. A test output of the trained learning machine may be post-processing to determine if the test output is an optimal solution. It also provides for the selection of kernel prior to training the support vector machine.

Guyon uses preprocessing and post-processing to handle noise and variation. Yet our invention uses decision regulation method that is patently distinctive from Guyon's method.

To address Examiner Hirl's feedback that "The claims and only the claims form the metes and bounds of the invention. Limitations appearing in the specification but not recited in the claim are not read into the claim", the claims are amended to include the patentable material in the specification.

The detailed remarks replying to Examiner Hirl's "Detailed Action" and "Reponse to Arguments" are discussed for each claim as follows:

Claim 1

Claim 1 step (c) is amended to add global characteristics and population characteristics "calculating weighted global class training sample proportion of the at least one decision node". This overcomes Guyon's Fig 9 input data structure.

This along with the significant changes to address 35 USC §101 as stated above clarifies the essence of the invention and overcomes the basis of Examiner Hirl's objection for claim 1.

Applicants respectfully submit that the amended claim 1 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claims 2 –3 are cancelled.

Claim 4

Claim 4 is amended to add "calculating weighted class training sample count for samples that are up to k layers above a node". This overcomes Guyon's predictive statistics in Guyon, p. 0185.

Applicants respectfully submit that the amended claim 4 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claim 5 is cancelled.

Claim 6

Claim 6 is amended to add "calculating weighted class training sample proportion of the at least one decision node". This overcomes Guyon's gene selection in Guyon, p. 0193.

Applicants respectfully submit that the amended claim 6 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claim 7

Claim 7 step (b) is amended to add "calculating weighted global class training sample proportion". This overcomes Guyon's p. 0194 showing the path of leaf node.

Claim 7 step (c) is amended to add "wherein the confidence value is defined as the ratio between characteristic value of a class and that of all classes". This overcomes Guyon's p. 0207.

These along with the significant changes to address 35 USC §101 as stated above clarifies the essence of the invention and overcomes the basis of Examiner Hirl's objection for claim 7.

Applicants respectfully submit that the amended claim 7 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claims 8 – 9 are cancelled.

Claim 10

Claim 10 is amended to add "calculating weighted class training sample proportion of the at least one terminal node of the decision tree". This overcomes Guyon's Figs. 1 input data.

Applicants respectfully submit that the amended claim 10 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claim 11

Claim 11 is amended to add "wherein the local count confidence for class c in a terminal node n is defined as

$$LC_c^{\,n} = \frac{N_c^{\,n}}{\sum_{c \in All\_Classes\_in\_n} N_c^{\,n}}$$

the local population confidence for class c in a terminal node n is defined as

$$LP_c^n = \frac{P_c^n}{\sum_{c \in All\_Classes\_in\_n} P_c^n}$$

the global count confidence for class c in a terminal node n is defined as

$$GC_c^n = \frac{G_c^n}{\sum_{c \in All\_Classes\_in\_n} G_c^n}$$

the global population confidence for class c in a terminal node n is defined as

$$GP_c^n = \frac{g_c^n}{\sum_{c \in All\_Classes\_in\_n} g_c^n} ."$$

This overcomes Guyon's p 0207.

Applicants respectfully submit that the amended claim 11 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claim 12 is cancelled.

Claim 13

Claim 13 is amended to add "wherein the global context is from layers above a node determined by the different layer depths". This overcomes Guyon's p 0364.

Applicants respectfully submit that the amended claim 13 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claim 14 is cancelled.

Claim 15

Claim 15 step (c) is amended to add "comparing local, global, count and population confidences". This overcomes Guyon's p 0207.

These along with the significant changes to address 35 USC §101 as stated above clarifies the essence of the invention and overcomes the basis of Examiner Hirl's objection for claim 15.

Applicants respectfully submit that the amended claim 15 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claim 16

Claim 16 is amended to add "R_{LP} defined as

$$R_{LP} = 1 - 2 * \left| \frac{LP_c^{\,n}}{(LC_c^{\,n} + LP_c^{\,n})} - 0.5 \right| ."$$

This overcomes Guyon's p 0207.

Applicants respectfully submit that the amended claim 16 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claim 17

Claim 17 is amended to add "R_c defined as

$$R_c = 1 - 2 * \left| \frac{GC_c^{\,n}}{(LC_c^{\,n} + GC_c^{\,n})} - 0.5 \right| ."$$

This overcomes Guyon's p 0207.

Applicants respectfully submit that the amended claim 17 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claim 18

Claim 18 is amended to add "R_P defined as

$$R_P = 1 - 2 * \left| \frac{GP_c^{\,n}}{(LP_c^{\,n} + GP_c^{\,n})} - 0.5 \right| ."$$

This overcomes Guyon's p 0207.

Applicants respectfully submit that the amended claim 18 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claim 19 is cancelled.

Claim 20

Claim 20 is amended to add "R_{GP} defined as

$$R_{GP} = 1 - 2 * \left| \frac{GP_c^{\ n}}{(GC_c^{\ n} + GP_c^{\ n})} - 0.5 \right| ."$$

This overcomes Guyon's p 0207.

Applicants respectfully submit that the amended claim 20 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claims 21-22 are cancelled.

Claim 23

Claim 23 step (d) is amended to add "comparing local, global, count and population confidences". This overcomes Guyon's p 0082, p 0207.

These along with the significant changes to address 35 USC §101 as stated above clarifies the essence of the invention and overcomes the basis of Examiner Hirl's objection for claim 23.

Applicants respectfully submit that the amended claim 23 has defined a subject matter worthy of being patented and has added appropriate limitations from the specification that clearly define an invention that is patentably over the prior art and the claim is in condition for allowance based on the above remarks.

Claim Objections – 35 USC §112

Examiner Hirl stated that claims need an appropriate rewrite to be consistent with 35 USC §112, six paragraph. The required terminology of "**means for**" or "**step for**" must be used.

Applicant appreciates the helpful feedback and guidance received from Examiner Hirl. All reamining claims are amended for the compliance to the 35 USC §112, six paragraph.

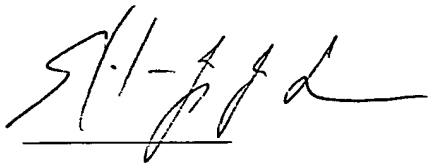
Conclusion

In view of the above remarks and arguments, applicant submits that all claims are remaining amended claims are patentably over the prior art and all claim rejections under 35 USC §101, 35 USC §102 and 35 USC §112 are overcome. Therefore applicant submits that this application is in condition for allowance, which action applicant respectfully solicits.

Conditional Request for Constructive Assistance

If for any reason this application is not believed to be in full condition for allowance, applicant respectfully requests the constructive assistance and suggestions of the Examiner pursuant to MPEP para. 707.07(j) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Respectfully submitted,



Shih-Jong J. Lee